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| 1997 Chevrolet S10 Pickup |
| 1996-97 SUSPENSION Front 4WD - "T" Series Trucks |

1996-97 SUSPENSION

Front 4WD - "T" Series Trucks

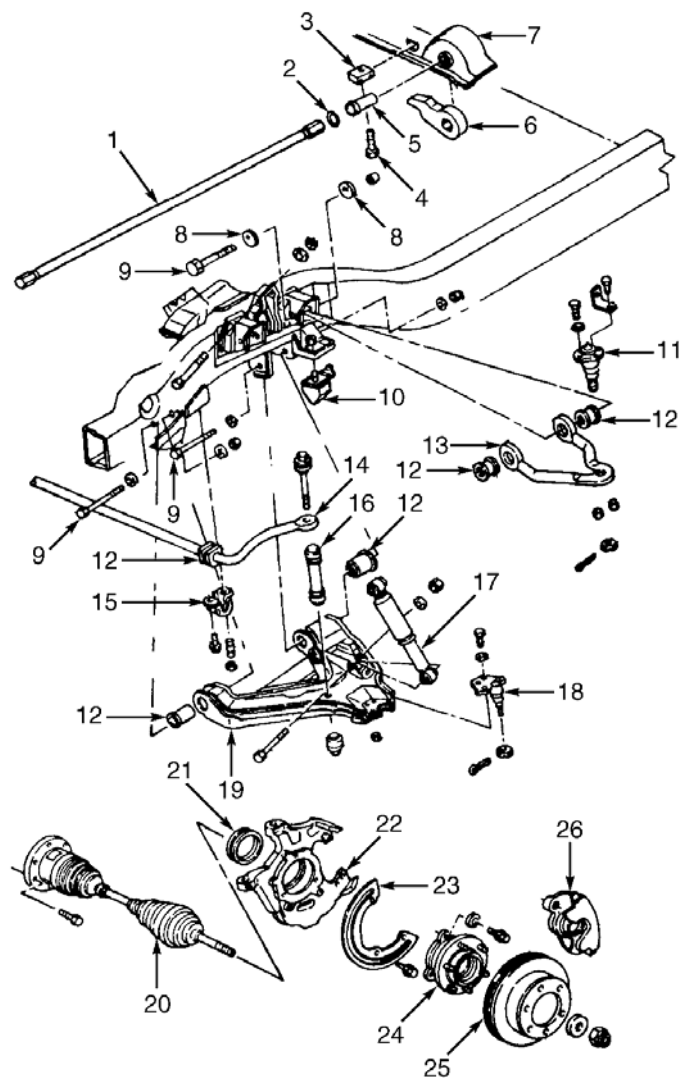
DESCRIPTION

Independent front suspension consists of upper and lower control arms with steering knuckle mounted between ball joints. See **Fig. 1**. Shock absorbers fit between lower control arm and frame. A stabilizer bar is mounted to frame side rails and connected to lower control arms.

Torsion bars are used in place of coil springs. Front of torsion bar attaches to lower control arm. Rear of torsion bar attaches to adjustable arm at torsion bar support crossmember. Adjustments to trim height are made here.

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- | | |
|-----------------------------|----------------------------|
| 1. Torsion Bar | 14. Stabilizer Bar |
| 2. Seal | 15. Clamp |
| 3. Adjusting Nut | 16. Spacer |
| 4. Adjusting Bolt | 17. Shock Absorber |
| 5. Anchor Adapter | 18. Lower Ball Joint |
| 6. Adjusting Arm | 19. Lower Control Arm |
| 7. Support | 20. Drive Axle |
| 8. Alignment Adjustment Cam | 21. Grease Seal |
| 9. Pivot Bolt | 22. Steering Knuckle |
| 10. Bumper | 23. Splash Shield |
| 11. Upper Ball Joint | 24. Hub & Bearing Assembly |
| 12. Bushing | 25. Rotor |
| 13. Upper Control Arm | 26. Brake Caliper |

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Fig. 1: Exploded View Of Front Suspension (Typical)
Courtesy of GENERAL MOTORS CORP.

ADJUSTMENTS & INSPECTION

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WHEEL ALIGNMENT

NOTE: See SPECIFICATIONS & PROCEDURES article in WHEEL ALIGNMENT.

FRONT WHEEL BEARINGS

Front wheel bearings are sealed, pre-adjusted and require no maintenance unless wheel hub and bearing assembly is removed. See WHEEL HUB & BEARINGS under REMOVAL & INSTALLATION.

RIDING HEIGHT

NOTE: See SPECIFICATIONS & PROCEDURES article in WHEEL ALIGNMENT.

UPPER BALL JOINT CHECKING

NOTE: Replace ball joint rubber grease seal if cut or damaged.

1. Raise and support vehicle with jackstand under lower control arm, near lower ball joint. Ensure upper control arm bumper does not contact frame. Place dial indicator against lower part of wheel rim. Push in on bottom of tire while pulling outward at top. Read dial indicator, then reverse push/pull procedure.
2. If lateral (horizontal) deflection exceeds .125" (3.18 mm), replace ball joint. With ball joint disconnected from steering knuckle, try to rotate ball joint by finger pressure. If ball joint can be rotated by finger pressure, replace ball joint.

LOWER BALL JOINT CHECKING

NOTE: Replace ball joint rubber grease seal if cut or damaged.

Raise and support vehicle with jackstand under lower control arm, near lower ball joint. Place a dial indicator on spindle hub. Pry wheel between lower control arm and outer race to measure vertical movement. Note dial indicator reading. If reading exceeds .125" (3.18 mm), replace loose ball joint.

REMOVAL & INSTALLATION

CAUTION: When battery is disconnected, vehicle computer and memory systems may lose memory data. Driveability problems may exist until computer systems have completed a relearn cycle. See **COMPUTER RELEARN PROCEDURES** article in **GENERAL INFORMATION** before disconnecting battery.

WHEEL HUB & BEARINGS

Removal

1. Raise and support vehicle. Remove wheel and tire assembly. Install Axle Shaft Boot Seal Protector (J-

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28712) to drive axle shaft boot to protect drive axle during repair. Depress brake caliper piston, detach brake caliper and wire aside. Remove brake rotor. See **Fig. 1**. Remove drive axle shaft nut cotter pin, retainer, drive axle shaft nut and washer. Pull hub and bearing assembly off drive axle shaft.

NOTE: **Darkened areas on bearing assembly are caused by heat treatment process and DO NOT indicate a need for replacement.**

2. Inspect steering knuckle grease seal for cuts, distortion and wear. Inspect steering knuckle, hub and bearing for damage. Replace as necessary. If wheel hub stud must be replaced, use Wheel Stud Remover (J-6627-A).

Installation

1. To install NEW wheel hub stud, lubricate hub bore and install stud. Place 4 washers on stud and install stud nut with flat side to washers. Tighten stud nut to draw stud into hub bore. Remove nut and washers. Install hub and bearing assembly onto drive axle shaft.
2. To complete installation, reverse removal procedure. Tighten bolts and nuts to specification. See **TORQUE SPECIFICATIONS** table. Depress brake pedal several times to extend caliper piston after installation.

STEERING KNUCKLE

Removal

1. Raise and support vehicle. Unload torsion bar tension. See **Fig. 2**. Count exact number of tool turns for reassembly reference. Slide, but DO NOT remove, torsion bar forward.
2. Remove wheel and tire assembly. Install Axle Shaft Boot Seal Protector (J-28712) to drive axle shaft boot to protect drive axle during repair. Depress brake caliper piston, detach brake caliper and wire aside. Remove brake rotor.
3. Remove drive axle shaft nut cotter pin, retainer, drive axle shaft nut and washer. Pull hub and bearing assembly off drive axle shaft. Remove splash shield. Remove cotter pin and tie rod end stud nut. Using Universal Steering Linkage Puller (J-24319-01), separate tie rod end from steering knuckle.
4. Remove upper and lower ball joint stud cotter pins. Place Ball Joint Separator (J-34026) over upper ball joint stud. Loosen ball joint stud nut. See **Fig. 3**. Back off nut until nut contacts tool. Continue backing off nut until nut forces ball stud out of steering knuckle. Remove spacer. Repeat procedure to separate lower ball joint from steering knuckle.
5. Remove steering knuckle from vehicle. Inspect steering knuckle grease seal for cuts, distortion and wear. Inspect steering knuckle, hub and bearing for damage. Replace as necessary.

Installation

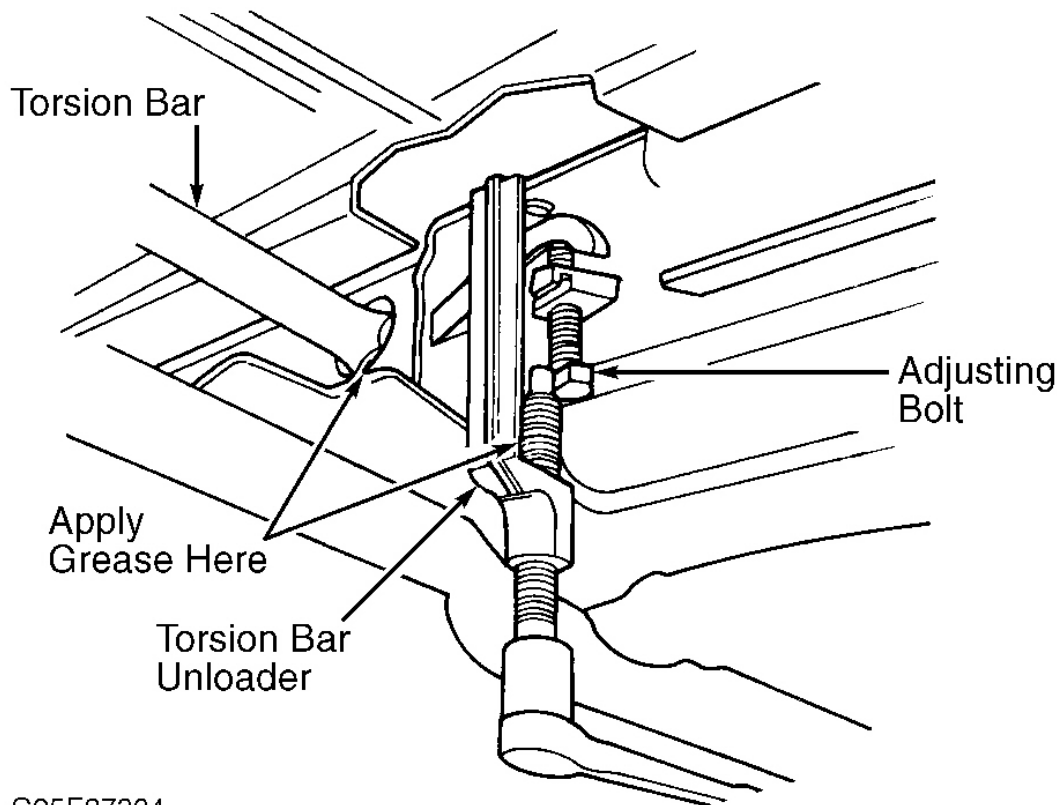
1. Using hammer and Steering Knuckle Seal Installer (J-28574), install NEW steering knuckle grease seal into steering knuckle. Install spacer (if equipped). Install steering knuckle onto upper and lower ball joint studs.

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CAUTION: When installing upper and lower ball joint stud nuts, tighten nut to align cotter pin hole. DO NOT tighten ball joint stud nuts more than an additional 1/6 turn to align cotter pin hole. Complete tightening of ball joint stud nuts with vehicle at proper riding height specification.

2. Install ball joint stud nuts and cotter pins. Install drive axle (if removed). Install tie rod end onto steering knuckle. Install tie rod end stud nut and cotter pin. Install splash shield. Install hub and bearing assembly onto drive axle shaft and into steering knuckle.
3. To complete installation, reverse removal procedure. Tighten bolts and nuts to specification. See **TORQUE SPECIFICATIONS** table. Lower vehicle. Check wheel alignment and adjust ride height. See **SPECIFICATIONS & PROCEDURES** article in WHEEL ALIGNMENT.



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Fig. 2: Unloading Torsion Bar Tension
Courtesy of GENERAL MOTORS CORP.

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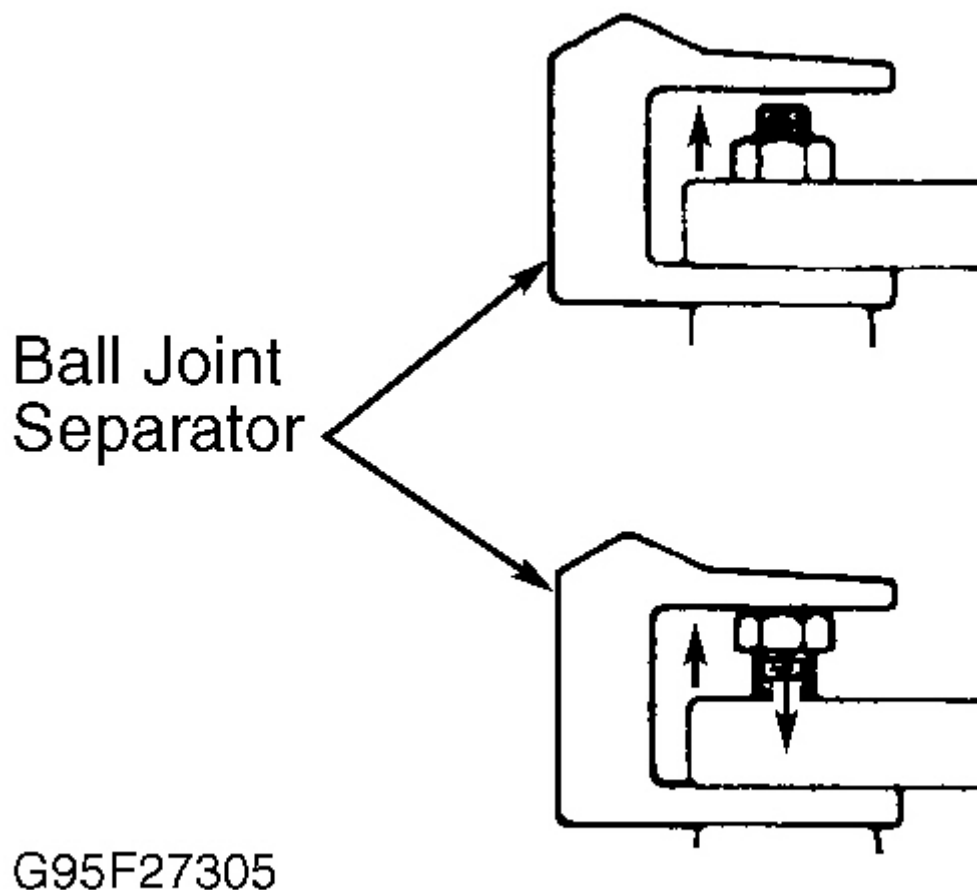


Fig. 3: Separating Ball Joint From Steering Knuckle
Courtesy of GENERAL MOTORS CORP.

SHOCK ABSORBERS

Removal

Raise and support vehicle. Remove wheel and tire assembly. Remove shock absorber retaining bolt and nut from lower control arm. Remove shock absorber retaining bolt and nut from frame. Remove shock absorber from vehicle.

Inspection

NOTE: Purging air from non-spiral groove shock is not required, as reservoir has

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gas-charged cell. Spiral groove shock has air-charged cell and air must be purged.

1. On spiral groove shock, purge air from pressure chamber by mounting shock in vise (top end up) and fully extending unit. Reverse position (top end down) and fully collapse unit. Repeat procedure several times.
2. Bench check shock unit by mounting in vise with top end up (top end down on gas-charged shocks). DO NOT clamp vise on reservoir tube or mounting threads. Check rubber grommets for deterioration and replace as needed.
3. Operate shock by hand at various rates of speed and note resistance. Rebound force is normally stronger than compression force. If resistance is not smooth and constant, replace shock.

Installation

To install, reverse removal procedure. Tighten bolts and nuts to specification. See **TORQUE SPECIFICATIONS** table.

STABILIZER BAR

Removal

NOTE: Keep right and left side stabilizer bar components separate for installation in original locations.

Raise and support vehicle. Remove wheel and tire assembly. Remove fasteners and separate stabilizer bar from lower control arm. Remove stabilizer bar. Remove stabilizer bar bushings. Replace bushings if deformed or deteriorated. Replace stabilizer bar and clamps if excessive worn or damaged.

Installation

Unload torsion bar tension. See **Fig. 2**. Count exact number of tool turns for reassembly reference. To install, reverse removal procedure. Ensure split in bushing faces toward front of vehicle. Tighten bolts and nuts to specification. See **TORQUE SPECIFICATIONS** table. Lower vehicle. Adjust ride height and check wheel alignment. See **SPECIFICATIONS & PROCEDURES** article in WHEEL ALIGNMENT.

UPPER BALL JOINT

Removal

1. Raise and support vehicle under lower control arms. Remove wheel and tire assembly. Remove upper ball joint stud nut and separate upper ball joint stud from steering knuckle using Ball Joint Separator (J-36607). Remove brakeline and brackets from upper control arm (if equipped).
2. Drill a 1/8" (3.18 mm) diameter by 1/4" (6.35 mm) deep hole in ball joint retaining rivets. Drill off rivet heads with a 1/2" (12.7 mm) drill bit. Drive out rivets with a hammer and small punch. Remove ball joint.

Installation

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CAUTION: When installing upper ball joint stud nut, tighten nut to align cotter pin hole. DO NOT tighten ball joint stud nut more than an additional 1/6 turn to align cotter pin hole. Complete tightening of upper ball joint stud nut with vehicle at proper riding height specification.

To install, reverse removal procedure. Use NEW nuts and bolts to install ball joint to upper control arm. Lubricate NEW ball joint. Tighten bolts and nuts to specification. See **TORQUE SPECIFICATIONS** table. Lower vehicle. Check ride height and adjust wheel alignment. See **SPECIFICATIONS & PROCEDURES** article in WHEEL ALIGNMENT.

LOWER BALL JOINT

Removal

1. Raise and support vehicle under lower control arms. Remove wheel. Remove steering knuckle. See **STEERING KNUCKLE**. Remove brakeline and brackets from lower control arm.
2. Drill a 1/8" (3.18 mm) diameter by 1/4" (6.35 mm) deep hole in ball joint retaining rivets. Drill off rivet heads with a 1/2" (12.7 mm) drill bit. Using a 5/16" (8 mm) drill bit, drill through 2/3 of the length of rivet shank. Drive out rivet with a 5/16" (8 mm) punch. Remove ball joint.

Installation

CAUTION: When installing lower ball joint stud nut, tighten nut to align cotter pin hole. DO NOT tighten ball joint stud nut more than an additional 1/6 turn to align cotter pin hole. Complete tightening of lower ball joint stud nut with vehicle at proper riding height specification.

To install, reverse removal procedure. Use NEW nuts and bolts to install ball joints to lower control arm. Lubricate NEW ball joint. Tighten bolts and nuts to specification. See **TORQUE SPECIFICATIONS** table. Lower vehicle. Check wheel alignment and adjust ride height. See **SPECIFICATIONS & PROCEDURES** article in WHEEL ALIGNMENT.

UPPER CONTROL ARM

Removal

1. Raise and support vehicle under lower control arms. Remove wheel. Remove upper ball joint stud cotter pin. Place Ball Joint Separator (J-34026) over upper ball joint stud. Loosen ball joint stud nut. See **Fig. 3**. Back off nut until nut contacts tool. Continue backing off nut until nut forces ball stud out of steering knuckle. Remove spacer.
2. Mark alignment adjustment cams for reassembly reference. Remove upper control arm pivot bolts, cams/washers and nuts. Remove upper control arm from vehicle. See **Fig. 4**. Replace bushings and/or bumper as necessary.

Installation

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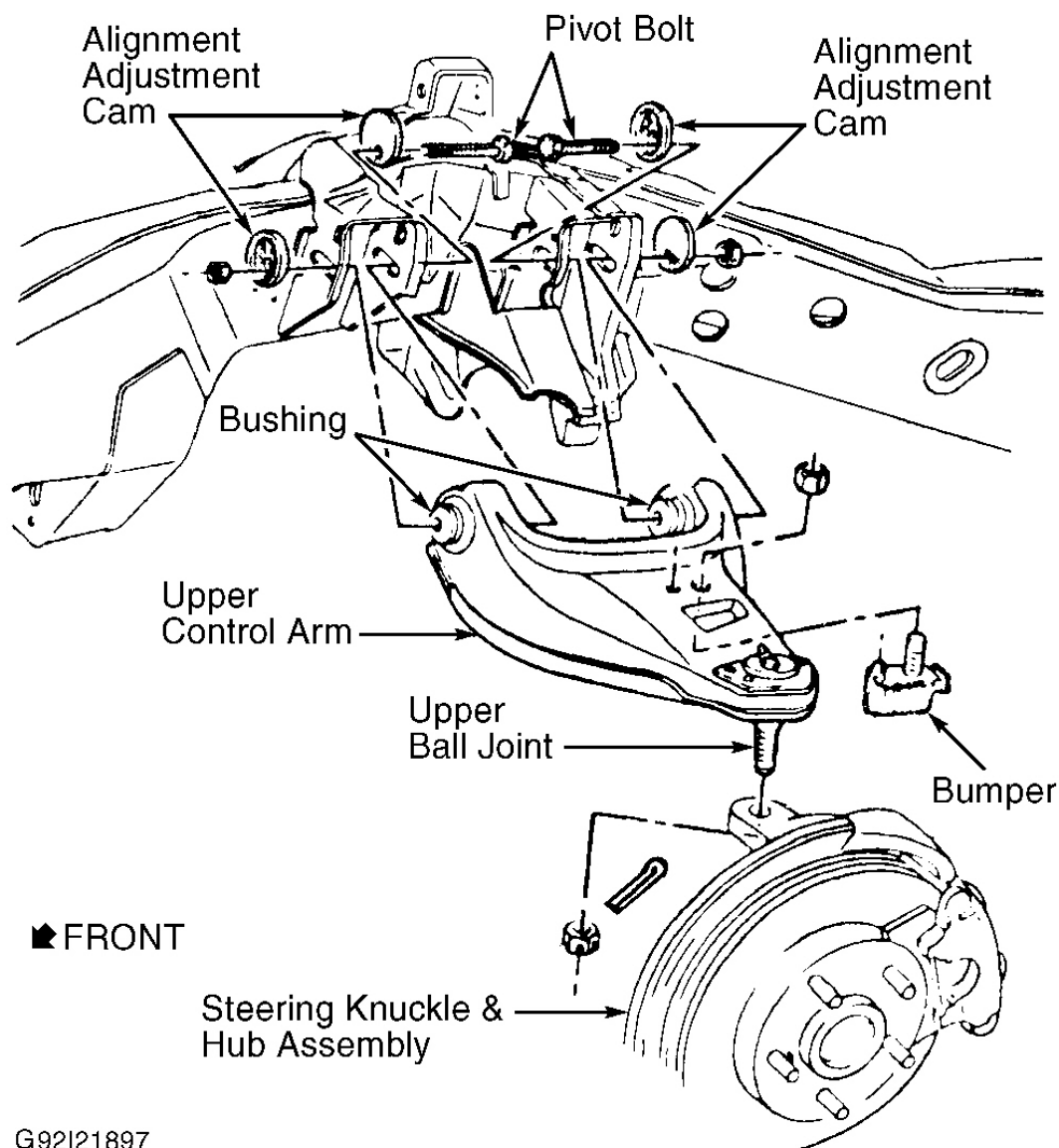
1. If upper control arm bumper is deteriorated or damaged, install NEW bumper. Mount upper control arm on vehicle. Install pivot bolts, alignment adjustment cams and NEW pivot bolt nuts.

CAUTION: When installing upper ball joint stud nut, tighten nut to align cotter pin hole. DO NOT tighten ball joint stud nut more than an additional 1/6 turn to align cotter pin hole. Complete tightening of upper ball joint stud nut with vehicle at proper riding height specification.

2. Ensure pivot bolt heads are facing inward. Connect steering knuckle to upper ball joint studs. To complete installation, reverse removal procedure. Tighten bolts and nuts to specification. See **TORQUE SPECIFICATIONS** table.
3. Lower vehicle. Check wheel alignment and adjust ride height. See **SPECIFICATIONS & PROCEDURES** article in WHEEL ALIGNMENT. Complete tightening of upper control arm pivot bolts and nuts with vehicle at proper riding height.

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Fig. 4: Exploded View Of Upper Control Arm
Courtesy of GENERAL MOTORS CORP.

UPPER CONTROL ARM BUSHINGS

Bushing Replacement

1. Remove upper control arm from vehicle. See **UPPER CONTROL ARM**. Place upper control arm in soft-jawed vise.
2. Press bushings out of upper control arm using Nut (J-21474-18), Bolt (J-21474-19), washer, bearing and

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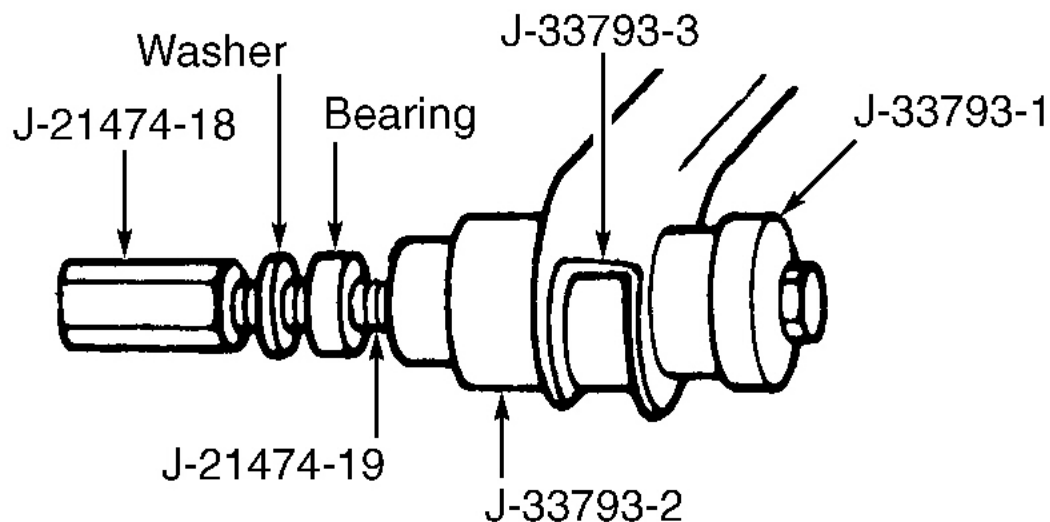
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Control Arm Bushing Service Set (J-33793). See **Fig. 5**.

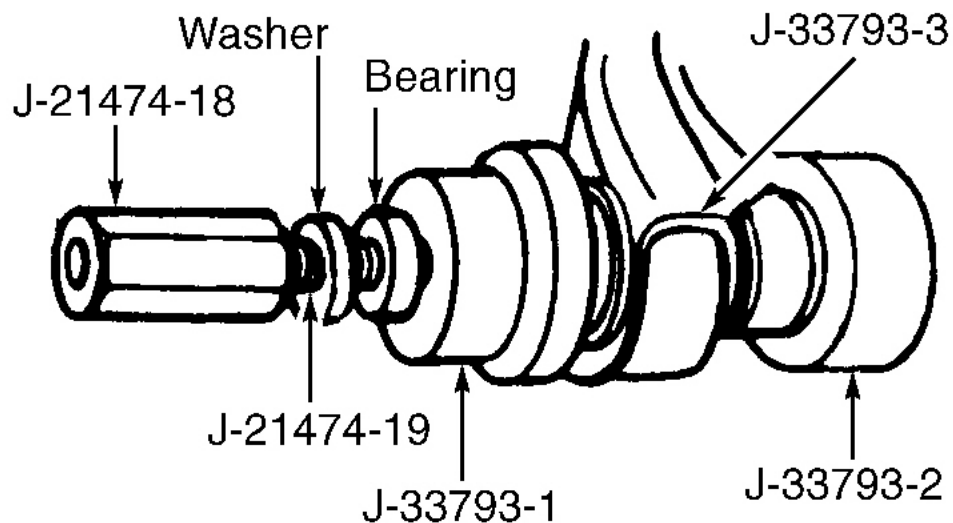
3. Install NEW bushings into upper control arm using Nut (J-21474-18), Bolt (J-21474-19), washer, bearing and Control Arm Bushing Service Set (J-33793). See **Fig. 5**.
4. Ensure bushings are properly seated in upper control arm. Install upper control arm. See **UPPER CONTROL ARM**.

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REMOVING UPPER CONTROL ARM BUSHING



INSTALLING UPPER CONTROL ARM BUSHING

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Fig. 5: Replacing Upper Control Arm Bushings
Courtesy of GENERAL MOTORS CORP.

LOWER CONTROL ARM

Removal

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1. Raise and support vehicle. Unload torsion bar tension. See **Fig. 2**. Count exact number of tool turns for reassembly reference. Slide torsion bar forward to remove adjuster arm. Remove wheel and tire assembly.
2. Remove drive axle nut. Remove stabilizer bar from vehicle. See **STABILIZER BAR**. Remove shock absorber from vehicle. See **SHOCK ABSORBERS**. Separate lower ball joint from steering knuckle. See **LOWER BALL JOINT**.
3. Remove lower control arm pivot bolts, nuts and washers. Remove lower control arm from vehicle. See **Fig. 1**. Replace bushings and/or bumper as necessary.

Installation

1. To install, reverse removal procedure. Install front leg of lower control arm onto vehicle, then rear leg. Install lower control arm pivot bolts, washers and NEW nuts, with bolt heads facing rearward.

CAUTION: When installing upper ball joint stud nut, tighten nut to align cotter pin hole. DO NOT tighten ball joint stud nut more than an additional 1/6 turn to align cotter pin hole. Complete tightening of upper ball joint stud nut with vehicle at proper riding height specification.

2. Tighten bolts and nuts to specification. See **TORQUE SPECIFICATIONS** table. Lower vehicle. Check wheel alignment and adjust ride height. See **SPECIFICATIONS & PROCEDURES** article in WHEEL ALIGNMENT. Complete tightening of lower control arm pivot bolts and nuts with vehicle at proper riding height specification.

LOWER CONTROL ARM BUSHINGS

Removal

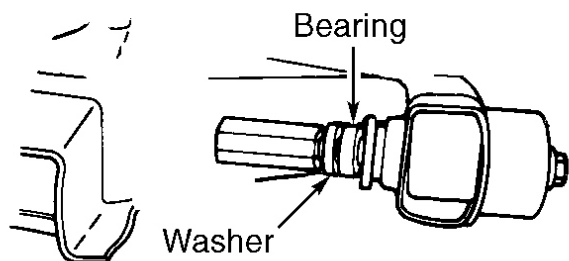
Remove lower control arm. See **LOWER CONTROL ARM**. Place lower control arm in a soft-jawed vise. Press bushings out of lower control arm using a washer, bearing and Control Arm Bushing Service Set (J-21474). See **Fig. 6**.

Installation

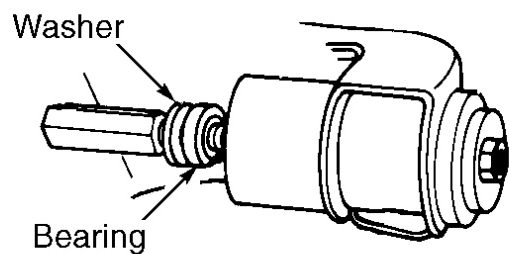
To install, reverse removal procedure. Press in bushings until properly seated. Install lower control arm. See **LOWER CONTROL ARM**.

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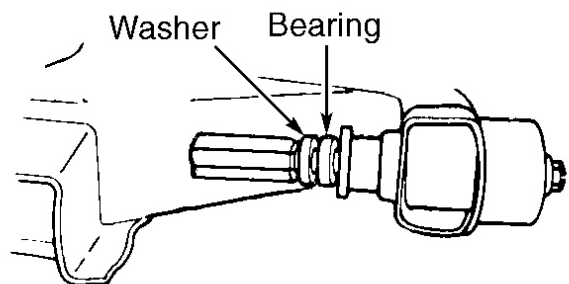
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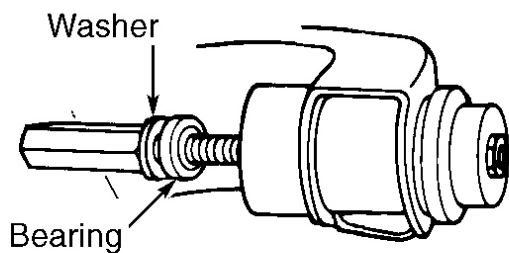
REMOVING LOWER FRONT BUSHING



INSTALLING LOWER FRONT BUSHING



REMOVING LOWER REAR BUSHING



INSTALLING LOWER REAR BUSHING

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Fig. 6: Replacing Lower Control Arm Bushings
Courtesy of GENERAL MOTORS CORP.

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Removal

1. Raise and support vehicle. Remove wheel and tire assembly. Unload torsion bar tension. See **Fig. 2**. Mark adjusting bolt setting. Using Torsion Bar Unloading Tool (J-36202), increase tension on adjusting arm. Remove torsion bar adjusting bolt, counting number of turns for reassembly reference.
2. Remove torsion bar adjusting nut. Slowly relieve torsion bar tension. Remove unloading tool. Slide torsion bar forward. Remove torsion bar adjusting arm. Remove support mounting bolts, nuts and washers. Remove support retainer, spacer and rubber insulator. See **Fig. 7**.
3. Disconnect muffler flange from catalytic converter. Loosen rear exhaust hanger and lower rear exhaust. Remove torsion bar support. Slide torsion bar rearward and remove from lower control arm.
4. Inspect torsion bars, adjusting arms, retainers, rubber insulators and support for bend, cracks, deterioration or damage. Check adjusting bolt and nut for damage or stripped threads. Replace as necessary.

Installation

1. Install torsion bar rubber insulators, spacer and support retainer onto support. Install support assembly onto frame, slightly behind mounting holes. Install rear exhaust and rear exhaust hanger. Connect muffler flange to catalytic converter.
2. Install adjusting arm and seal onto torsion bar. Slide torsion bar into lower control arm in original position. Slide torsion bar support forward, engaging rear of torsion bar in support. Install support mounting bolts, nuts and washers. Tighten bolts and nuts to specification. See **TORQUE SPECIFICATIONS** table.
3. Install adjusting bolt and nut on each torsion bar. Add tension to torsion bar with Torsion Bar Unloading Tool (J-36202). Ensure adjusting bolt is positioned to setting marked before removal. Release tension on unloading tool until tension is taken up by adjusting bolt. Remove unloading tool. Lower vehicle. Check wheel alignment and adjust ride height. See **SPECIFICATIONS & PROCEDURES** article in WHEEL ALIGNMENT.

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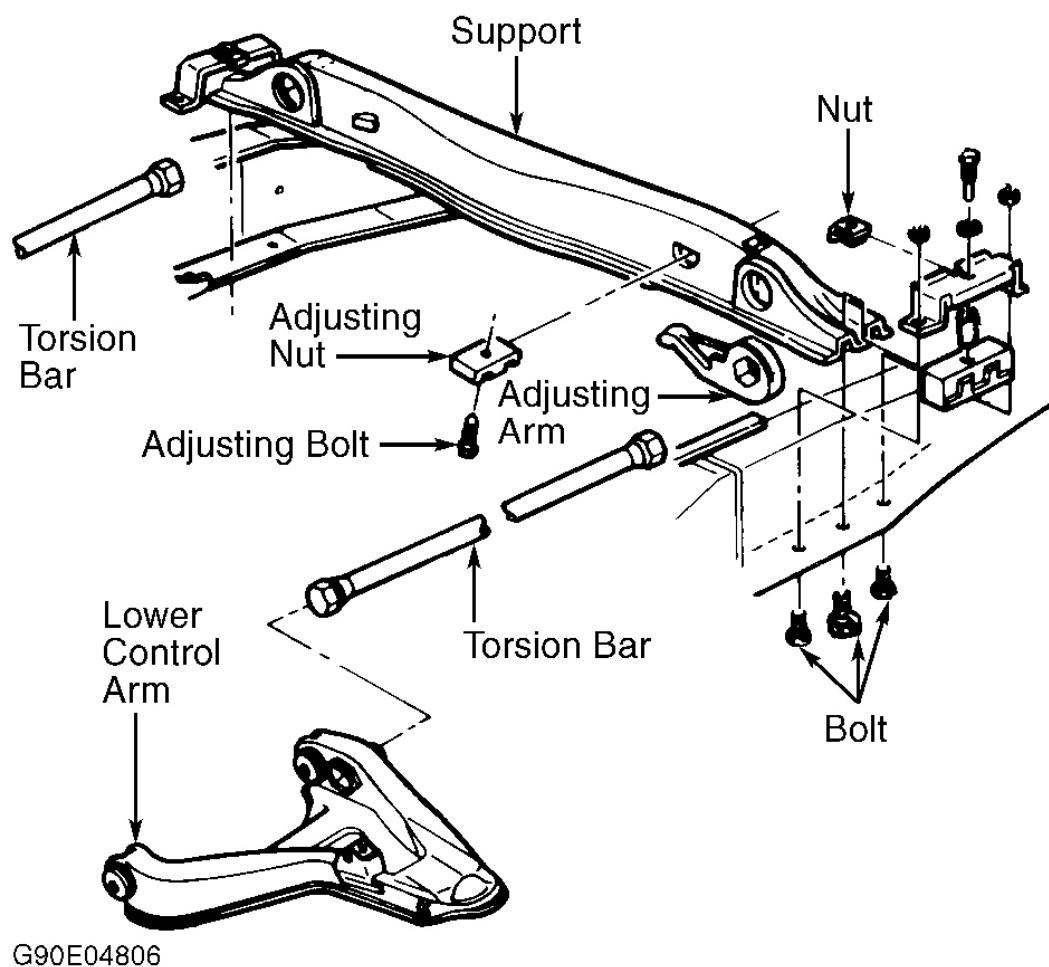


Fig. 7: Exploded View Of Torsion Bar & Support Assembly
Courtesy of GENERAL MOTORS CORP.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

| Application | Ft. Lbs. (N.m) |
|---|----------------|
| Ball Joint-To-Control Arm Nut ⁽¹⁾ | 17 (23) |
| Ball Joint-To-Steering Knuckle Nut ^{(1) (2)} | |
| Lower | 79 (107) |
| Upper | 61 (83) |
| Drive Axle Shaft Nut | 181 (245) |
| Hub & Bearing/Shield-To-Steering Knuckle Bolt | 77 (105) |
| | 81 (110) |

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| Lower Control Arm-To-Frame Pivot Bolt ⁽¹⁾ ⁽⁵⁾ | |
| Lower Control Arm-To-Frame Pivot Bolt Nut ⁽¹⁾ ⁽³⁾ ⁽⁵⁾ | 81 (110) |
| Shock Absorber Nut ⁽⁴⁾ | 54 (73) |
| Stabilizer Bar Clamp-To-Frame Bolt | 26 (35) |
| Stabilizer Bar-To-Lower Control Arm Bolt | 11 (15) |
| Tie Rod End-To-Steering Knuckle Nut | 39 (53) |
| Torsion Bar Retainer-To-Support Link Nut | |
| Lower | 50 (68) |
| Upper | 33 (48) |
| Upper Control Arm-To-Frame Pivot Bolt Nut ⁽¹⁾ | |
| Front | 85 (115) |
| Rear | 72 (98) |
| Wheel Lug Nut | 95 (129) |

- (1) Complete tightening of bolts and/or nuts with vehicle at proper riding height specification.
- (2) Tighten nut to align cotter pin hole. DO NOT tighten nut more than an additional 1/6 turn to align cotter pin hole.
- (3) Use NEW nuts during reassembly.
- (4) Install both bolts with nuts facing rear of vehicle.
- (5) Install upper/rear bolt with nut facing rear of vehicle. Install lower/front bolt with nut facing front of vehicle.